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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/752,587	12/27/2000	Gilbert Neiger	42390.P9768	1639

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EXAMINER

TAKEGUCHI, KATHY K

ART UNIT	PAPER NUMBER
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2187

DATE MAILED: 05/27/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Handwritten mark

Office Action Summary

Application No.

09/752,587

Applicant(s)

NEIGER ET AL.

Examiner

Kathy Takeguchi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-15, 17, 18, 21-23 and 25-30 is/are rejected.
- 7) ☒ Claim(s) 4, 7, 8, 12, 16, 19, 20, 23 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3, 5, 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. The present Office Action is a Non-Final Action taken in response to examination of Claims 1-30, presented in the application. Applicant is reminded that each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in 37 CFR 1.56.

2. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification, the drawings or the claims.

Information Disclosure Statement

3. The Electronic Information Disclosure Statement, received on October 9, 2002, has been corrected. Citation Number P02, United States Patent 4,307,214 does not correspond to the inventor Birney, et al. The IDS has been corrected to indicate the inventor of United States Patent 4,307,214 as McDaniel et al.

Claim Objections

4. Claim 23 is objected to because of the following informality: insufficient antecedent basis for the limitation, "random region" in the claim. Appropriate correction is required.

Claim 23 recites a "random region" and depends on Claim 13. However, Claim 13 fails to recite the limitation of a random region. Applicant can overcome the above recited objection by changing the dependency of Claim 23 to depend upon Claim 22.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3, 5-6, 9, 13-15, 17-18, 21, and 25-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Kevin Lawton ("Running Multiple Operating Systems Concurrently on an IA32 x86 PC Using Virtualization Techniques"; <http://www.plex86.org/research/paper.txt> ; reference cited in IDS).

As per Claims 1-2, 28-29:

In the section entitled, "Mapping the Actual Monitor Interrupt Handler Code into the Guest Linear Space" (pages 18-19), Lawton discusses a method and corresponding computer readable medium comprising: detecting that a guest operating system attempts to access a region (e.g., "guest-OS marks a linear address range as not free anymore") occupied by a first portion of a virtual machine monitor (VMM) within a first address space (e.g., address range for the monitor code); and relocating the first portion of the VMM within the first address space to allow the guest operating system to access the region previously occupied by the first portion of the VMM (e.g., changing the segment descriptor base addresses for the code and data, remapping the handler code to another linear address range which is currently free). Additionally, the IDT and

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GDT must occupy the same linear address domain as the guest code which is executing (e.g., page 17).

As per Claims 13-14 and 25-26:

In the section entitled, "Mapping the Actual Monitor Interrupt Handler Code into the Guest Linear Space" (pages 18-19), Lawton discusses an apparatus and a corresponding method comprising: a first address space associated with a guest operating system (e.g., address space occupied by guest-OS); a second address space associated with a virtual machine monitor (e.g., address space occupied by the virtual machine monitor—monitor code: GDT and IDT); detecting that a guest operating system attempts to access a region (e.g., "guest-OS marks a linear address range as not free anymore") occupied by a first portion of a virtual machine monitor (VMM) within a first address space (e.g., address range for the monitor code); and relocating the first portion of the VMM within the first address space to allow the guest operating system to access the region previously occupied by the first portion of the VMM (e.g., changing the segment descriptor base addresses for the code and data, remapping the handler code to another linear address range which is currently free). Additionally, the IDT and GDT must occupy the same linear address domain as the guest code which is executing (e.g., page 17).

As per Claims 3, 15, and 27:

Lawton also discusses the monitor including a set of trap handlers and an interrupt-descriptor table (See section entitled, "Mapping the Monitor's GDT and IDT into the Guest Linear Space").

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As per Claims 5-6 and 17-18:

Lawton also teaches receiving control (e.g., page 19 in conjunction with table on page 15; also bottom of page 18) over an event initiated by the guest operating system when the event may potentially cause an address space conflict between the guest operating system and the VMM. Additionally, Lawton also teaches setting access rights of the section occupied by the first portion of the VMM to a more privileged level than a privilege level associated with the guest operating system (e.g., Table on page 15); and receiving a trap caused by an attempt of the guest operating system to access a hardware resource having a higher privilege level than the privilege level associated with the guest operating system (e.g., pages 15-19)

As per Claims 9 and 21:

Lawton also teaches finding an unused region within the first address space; and re-mapping the first portion of the VMM into the unused region (e.g., relocating the monitor code and remapping the handler code to another address range, which is currently free).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 10-11, 22-23, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kevin Lawton in view of Official Notice.

As per Claims 10-11, 22-23, and 30:

Although Lawton teaches the concept of relocating monitor code via remapping in the event that it conflicts with the address range marked by the guest-OS, Lawton does not specifically mention the following operations: determining that no unused region exists within the first address space; selecting a random region within the first address space; copying content of a memory located at a random region to the second address space; and re-mapping the first portion of the VMM into the random region. Additionally, Lawton does not specify that if attempts are made to locate the content of the memory previously located at the random region, a control means would access the copied content of the memory in the second address space. However, the Examiner takes Official Notice in regards to the operations specified above.

The *concept* of selecting a random region within a memory space that is already full and copying the content of the random region to a second region of a second address space in order to be able to store other data into the random region is well known in the memory art. For example, this concept is taught in terms of a cache memory (e.g., first address space) that has reached its capacity. Thus, using the random replacement algorithm/policy, the cache transfers data to main memory (e.g., second address space) to free up a random memory location in the cache (e.g., first address space). Additionally, if the content of the memory that was previously located at the random region within the cache needed to be accessed, the copied content of the

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memory within main memory would be accessed (e.g., the second address space). --Official Notice--

Thus, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to specify these concepts with the teachings of Lawton because it would allow for the availability of memory space within the first memory region for relocating the monitor code. Additionally, it would allow for the retrieval of the contents that previously occupied the memory region.

Allowable Subject Matter

9. Claims 4, 7-8, 12, 16, 19-20, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathy Takeguchi whose telephone number is (703) 305-8115.

The examiner can normally be reached on Monday - Friday, 8:30AM - 5:00PM.

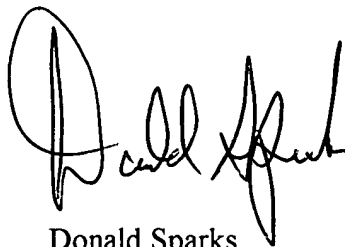
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (703) 308-1756. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

KT

Kathy Takeguchi
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May 22, 2003

A handwritten signature in black ink, appearing to read "Donald Sparks". The signature is stylized with a large initial "D" and a long, sweeping underline.

Donald Sparks
Supervisory Patent Examiner
Technology Center 2100